

- 2 -

**Amendments to the Specification:****Please amend paragraph [0002] as follows:**

B<sup>1</sup>

[0002] Recently, much attention is paid to a GaN-based compound semiconductor (hereinafter, often called as a "GaN-based semiconductor") as a semiconductor constituting a light-emitting layer of a blue light-emitting device. Such a GaN-based semiconductor is formed by a MOCVD method using a trimethylgallium as a Ga raw material gas and an ammonia gas as a N<sub>2</sub> raw material gas on a substrate consisting of different materials such as sapphire.

**Please amend paragraph [0007] as follows:**

B<sup>2</sup>

[0007] In order to achieve the above object, this invention relates to a semiconductor element, including a substrate, an underlayer, on the substrate, made of a first semiconductor nitride including at least Al element, the crystallinity of the underlayer being set to 90 seconds or below in full width at half maximum of (FWHM) X-ray rocking curve, a buffer layer, on the underlayer, made of a second semiconductor nitride, and a semiconductor layer group, on the buffer layer, made of a third semiconductor nitride including at least Ga element. In this case, the Al content of the third semiconductor nitride is set smaller than that of the first semiconductor nitride.

**Please amend paragraph [0008] as follows:**

B<sup>3</sup>

[0008] The inventors had intensely studied for achieving the above object. As a result, they found out that in a semiconductor element including a given substrate and a GaN-based

- 3 -

Cont  
B3

semiconductor layer group on the substrate, if a buffer layer is formed between the substrate and the semiconductor layer group, as in the above-~~discussed~~ the Japanese Laid-open Publication, and in addition, an underlayer satisfying the above requirements according to the present invention is formed between the buffer layer and the substrate, the object of the present invention can be achieved.

Please amend paragraph [0010] as follows:

B4

[0010] On the contrary, in a semiconductor element according to the present invention, the high crystallinity underlayer is formed between the buffer layer and the substrate. Therefore, because of the high crystallinity of the underlayer, the crystallinity of the semiconductor layer group can be sufficiently improved, even while being positioned on the low crystallinity buffer layer.

Please amend the paragraph beginning on page 2, line 32 as follows:

B5

For better understanding of the present invention, reference is made to the attached drawings, wherein;

Fig. 1 is a cross sectional view showing a semiconductor light-emitting element according to the present invention.

Please amend the heading beginning on page 3, line 3 as follows:

B6

Detailed Description of the Invention Preferred Embodiments

- 4 -

Please amend paragraph [0014] as follows:

B7  
[0014] It is required according to the present invention that the first semiconductor nitride constituting the underlayer 2 includes Al element. Generally, the composition of the first semiconductor nitride can be represented as  $Al_xGa_yIn_{1-x-y}N$  ( $0 < x \leq 1$ ,  $0 \leq y < 1$ ). Also, the first semiconductor nitride may include an additive element such as Ge, Si, Mg, Zn, Be, P or B as occasion demands. Moreover, the first semiconductor nitride may include a minute impurity contained in the raw material gases or the reactor or contained dependent on the forming condition. It is desired that the first semiconductor nitride includes Al element of at least 50 atomic percentages or over more of Al for all of the III elements, particularly Al element of 100 atomic percentages of Al as a III element, that is, being made of AlN.

Please amend paragraph [0015] as follows:

B8  
[0015] Then, it is required that the underlayer 2 has a high crystallinity of 90 seconds or below, preferably 50 seconds or below in FWHM of X-ray rocking curve. As of now, by controlling the forming conditions, the crystallinity of the underlayer 2 can be developed to about 30 seconds in FWHM of X-ray rocking curve.

Please amend paragraph [0018] as follows:

B9  
[0018] The formation temperature is much higher than that of the buffer layer, which is usually set to within 500-700°C.

- 5 -

Please amend paragraph [0020] as follows:

B10

[0020] The thickness of the underlayer 2 is determined appropriately, depending on the thickness and the formation conditions of the semiconductor layer group 4 and the buffer layer 4<sub>3</sub>. Preferably, the thickness of the underlayer 2 is set to 0.01  $\mu\text{m}$  or over, particularly within 0.5-1000  $\mu\text{m}$ , and more particularly within 0.8-5  $\mu\text{m}$ . In this case, the crystallinity of the semiconductor layer group 4 can be easily developed.

Please amend paragraph [0029] as follows:

B11

[0029] It is required that the Al content of the third semiconductor nitride constituting the semiconductor layer group 4 is set smaller than that of the first semiconductor nitride constituting the underlayer 2. In this case, a given compressive stress is exerted on the semiconductor layer group 4 from the underlayer 2, and thus, cracks formation are not almost created in the semiconductor layer group 4 is suppressed.

Please amend paragraph [0030] as follows:

B12

[0030] Herein, since the thickness of the buffer layer 3 is thinner than those of the underlayer 2 and the semiconductor layer group 4, a stress that is ~~not almost~~ exerted on the buffer layer 3 is minimized. Therefore, the material composition of the second semiconductor nitride constituting the buffer layer 3 can be appropriately determined, independent of the first semiconductor nitride and the third semiconductor nitride constituting the underlayer 2 and semiconductor layer group 4, respectively, only if the buffer layer 2<sub>3</sub> can exhibit the buffer effect.

- 6 -

**Please amend paragraph [0040] as follows:**

B13  
[0040] In this case, the buffer layer 3 serves as a cap layer for the underlayer 2, so that the semiconductor layer group 4 is not ~~almost~~greatly affected from the oxide film. As a result, the degradation in crystallinity of the semiconductor layer group 4 can be inhibited. In this case, the oxidized portion of the buffer layer 3 is etched. Moreover, although the buffer layer 3 may be etched entirely, thereafter, another buffer layer must be formed.

**Please amend paragraph [0048] as follows:**

[0048]

(Comparative Example)

B14  
Except that the AlN underlayer is not formed, a semiconductor element was fabricated in the same manner as the above-discussed Example. In this case, since the semiconductor element does not include the AlN underlayer, the crystallinity of the GaN semiconductor layer was only 300 seconds in FWHM of X-ray rocking curve, which is much more inferior to that of the GaN semiconductor layer in the Example.

**Please amend paragraph [0049] as follows:**

B15  
[0049] Although the present invention was described in detail with reference to the above examples, this invention is not limited to the above disclosure and every kind of variation and modification may be made without departing from the scope of the present invention. For example, for more enhancing of the crystallinity of the semiconductor layer group, a multilayered structure such as a distorted superlattice structure may be inserted into the semiconductor layer group or between the semiconductor layer group and the buffer layer.